

## **REMARKS**

### ***Summary of Office Action***

In the Office Action of December 10, 2007, the Examiner objected to the specification due to a minor informality. The Examiner also objected to claim 1, 3 and 8 due to minor informalities. The Examiner rejected claims 1-9 under 35 U.S.C. 112, second paragraph, for allegedly being indefinite. The Examiner also rejected claim 9 as being anticipated under 35 U.S.C. 102(b) or, in the alternative, under 35 U.S.C. 103(a) as being obvious over RU 2,103,418 (hereinafter referred to as "RU '418"). The Examiner further rejected claim 9 under 35 U.S.C. 102(b) as being anticipated by, or in the alternative under 35 U.S.C. 103(a) as being obvious over U.S. Patent No. 3,997,301 to Yoshihara et al. (hereinafter referred to as "Yoshihara"). The Examiner also rejected claim 9 under 35 U.S.C. 102(b) as being anticipated by, or in the alternative under 35 U.S.C. 103(a) as being obvious over, U.S. Patent No. 5,871,631 to Ichiba et al. (hereinafter referred to as "Ichiba"). The Examiner rejected claims 1 and 2 under 35 U.S.C. 103(a) as being unpatentable over RU '418 in combination with U.S. Patent No. 6,322,686 to Brown et al. (hereinafter referred to as "Brown") and the article "Improvement of Lubricity of Water-Containing Fluid Based on Proxamine 385," to Kalinin, *Ivanovo Chemical Technology Institute*, No. 11, pages 27-28, November 1986 (hereinafter referred to as "Kalinin"). The Examiner also rejected claims 3-8 under 35 U.S.C. 103(a) as being unpatentable over RU '418 in combination with Brown and Kalinin and further in view of Ichiba. No other issues were presented.

### ***Summary of Amendment***

Upon entry of the present Amendment, Claims 1, 3-4 and 8 will have been amended and claims 2 and 9 will have been canceled. Accordingly, Claims 1 and 3-8 remain currently pending. By the present amendment, Applicant submits that the rejections have been overcome and respectfully requests reconsideration of the outstanding Office Action.

***Applicant's Response***

1. Objection to Specification

The Examiner objected to the specification because the Examiner asserts that the phrase "by the use the composition" on page 6, line 5, is unclear (*see, e.g.,* Office Action page 2.)

Applicants note that the lack of clarity in this phrase is due to a minor typo-type error. Accordingly, the phrase is being amended herewith to recite "by the use of the composition," and thus is now believed to be clear and readily understandable to those of ordinary skill in the art. Applicants therefore respectfully request that the objection to the specification be withdrawn

2. Objection to Claims 1, 3 and 8

The Examiner objected to claims 1, 3 and 8 due to minor informalities (*see, e.g.,* Office Action pages 2-3.)

In particular, the Examiner objected to claim 1 and requested that the word -- a -- be inserted after the word "having". The Examiner also requested that the word "claims" in claim 3 be amended to the singular "claim". The Examiner further requested that the word -- a -- be inserted after the second occurrence of the word "of" in claim 8. All of these amendments have been made as requested by the Examiner. Accordingly, Applicants respectfully request that the objections to the claims be withdrawn.

3. Rejection of Claims 1-9 under 35 U.S.C. 112, Second Paragraph

The Examiner rejected claims 1-9 under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter of the invention (*see, e.g.,* Office Action pages 3-4.) This rejection is respectfully traversed.

With regards to claim 1, the Examiner asserts that the parenthetical phrase “(in a form of tin sulfamate)” is indefinite because of the presence of the parenthesis, and the phrase “number of ethylene oxide links-to-number of propylene oxide links” is indefinite because of the presence of the quotations. Accordingly, claim 1 is being amended to comply with the Examiner’ suggested correction delete the parenthesis and quotation marks from these phrases, and thus claim 1 is now believed to be in compliance with 35 U.S.C. 112, second paragraph.

Regarding claim 3, the Examiner asserts that it is unclear whether the “tinning composition” as recited in the claim was the same as the “composition” of claim 1 from which claim 3 depends. Claim 3 is being amended herewith to delete the term “tinning” such that the “composition” recited in the claim is clearly understood to refer to the composition recited in claim 1.

Regarding claim 4, the Examiner suggests that the claim be amended to change the phrase “strip conveying speed” to “the steel strip conveying at a speed” to make it clear that the strip being referred to therein is the steel strip recited in claim 3. Applicants thank the Examiner for the suggestion, and have complied with this suggested amendment.

The Examiner further rejected claim 3 and claims 4-9 depending therefrom as being incomplete for omitting essential steps, namely the method steps for electrotinning. In particular, the Examiner asserts that as the body of claim 3 recites “using a tinning composition” but does not otherwise recite process steps for electrotinning, the claim omits the step(s) that are essential to achieve electrotinning (*see, e.g.*, Office Action page 4.)

Claim 3 is being amended herewith to recite:

“Method for electrotinning a surface in form of a steel strip or plate, the method comprising:

electrolytically coating the surface in the presence of the composition according to claim 1.”

Accordingly, claim 3 as amended is considered to recite the step(s) that are essential to accomplish the electroplating method because the claim recites electrolytically coating the surface, i.e., performing a step in which the surface is coated by electrolytic means, in the presence of the composition of claim 1, i.e., in the presence of the composition suitable for electroplating surfaces with tin that is recited in claim 1 from which claim 3 depends. Thus, the method step(s) as recited in the body of the claim perform the essential steps necessary to achieve electroplating of a surface by requiring that the surface be electrolytically coated in the presence of a tin-electroplating composition. Accordingly, it is considered that claim 3 and the claims depending therefrom meet the requirements of 35 U.S.C. 112, second paragraph, and the withdrawal of this rejection is respectfully requested.

4. Rejection of Claim 9 under 35 U.S.C. 102(b) or alternatively 35 U.S.C. 103(a) over RU ‘418, Yoshihara or Ichiba

The Examiner rejected claim 9 as being anticipated under U.S.C. 102(b), or alternatively as being obvious under 35 U.S.C. 103(a), over RU ‘418. The Examiner similarly rejected claim 9 as being anticipated and/or obvious over Yoshihara, and as being anticipated and/or obvious over Ichiba (*see, e.g.*, Office Action pages 4-10.)

Claim 9 is being canceled with the present amendment, and thus the rejection of the claim over these references is now moot.

5. Rejection of Claims 1-2 under 35 U.S.C. 103(a) over RU ‘418, Brown and Kalinin

The Examiner rejected claims 1-2 under 35 U.S.C. 103(a) as being obvious over RU ‘418 in view of Brown and Kalinin. In particular, the Examiner asserts that RU ‘418 teaches all of the limitations of the claims with the exception of 50-90 g/l of tin sulfamate, the copolymer having a molecular weight of 3950 to 6450, a copolymer having the ratio of ethylene oxide to propylene oxide, and the pH of 0.6 to 1.1 (*see, e.g.*, Office Action parts a.-

d. on pages 11-13), whereas Brown teaches providing low speed and high speed plating concentrations of tin (*see, e.g.*, Office Action page 11), and Kalinin teaches a molecular weight of Proxamine 385 (*see, e.g.*, Office action page 12.) This rejection is respectfully traversed.

Claim 1 is patentable over the references cited by the Examiner because the references do not teach or suggest the composition recited in the claim, and also do not teach or suggest the unexpectedly good results that are obtained in electroplating and electroplating with the composition as claimed. As amended, claim 1 recites:

“A composition to be used in a process for electroplating surfaces with tin, said composition comprising the following components (g/l):

- Tin in a form of tin sulfamate                      50-90
- Sulfamic acid, free                                      40-100
- Sulfates, in a form of  $\text{SO}_4^{2-}$                       0-15
- Nitrogen-bearing block copolymer  
of propylene oxide and ethylene oxide                      1-6

said copolymer having a molecular weight of 3950 to 6450 and number of ethylene oxide links-to-number of propylene oxide links ratio of 1.4-1.2:1.0, at initial buildup of required number of links from propylene oxide followed by oxyethylation, the composition having a pH of 0.6 to 1.1.

In contrast, the RU '418 reference is directed to a composition containing “tin in the form of bivalent ions,” sulfamic acid and the copolymer proxamine-385 in water (*see, e.g.*, Abstract.) It is noted that the RU '418 reference does not teach or suggest providing tin in the form of tin sulfamate, as claimed. While RU '418 teaches that the tin is in the form of bivalent ions, the reference does not teach or suggest that such ions correspond to the claimed sulfamate form. Furthermore, RU '418 does not teach or suggest providing the block copolymer having the molecular weight of 3950 to 6450 and ratio of ethylene oxide to propylene oxide of 1.4-1.2:1.0 as claimed, and also does not teach or suggest maintaining the

claimed pH of the composition of 0.6 to 1.1, which features have also been discovered to provide unexpectedly good results in the electroplating of tin.

With regards to the requirement that the tin be provided in the form of tin sulfamate, as recited in the claim, it is noted that Brown does not make up for the deficiencies of RU '418, because Brown also does not teach or suggest providing tin in the claimed form. Brown teaches that the tin can be provided in an electrolyte composition for electroplating as compounds such as "tin sulfate, tin chloride, tin alkane sulfonate or tin aryl sulfonate" (column 3, lines 24-25), but does not teach or suggest providing the particular compound that is tin sulfamate in such a composition. Kalinin also does not teach or suggest providing tin in the form of tin sulfamate as claimed, and instead is directed to the non-analogous subject matter of improving the lubricity of water-containing fluid with Proxamine-385 (*see, e.g., Title.*) Accordingly, the Examiner has failed to make a proper *prima facie* rejection of claim 1, because the Examiner has not found a teaching or suggestion for each and every limitation of the claim (*see, e.g., MPEP § 2143.03.*) In particular, the Examiner has not provided any reasoning for why one of ordinary skill in the art would have been motivated to provide the particular form of tin that is tin sulfamate as a part of an electroplating composition, based on the teachings of any of the RU '418, Brown or Kalinin references.

With regards to the claimed block copolymer, it is noted that the nitrogen-bearing block-copolymer of propylene oxide and ethylene oxide having the molecular weight of from 3950 to 6450, and ratio of ethylene oxide to propylene oxide of 1.4-1.2:1.0, is also not taught or suggested by the cited references either individually or as in combination. As discussed above, the RU '418 reference teaches providing the particular copolymer that is proxamine-385 (*see, e.g., Abstract*), but does not teach or suggest providing a copolymer that meets the limitations as claimed. In particular, it is noted that proxamine-385 is a copolymer having a molecular weight of 7600 (*see, e.g., paragraph [0039] of instant specification*), and thus is substantially larger than the copolymer as claimed. Furthermore, the RU '418 reference does not teach or suggest that the proxamine-385 copolymer has a ratio of ethylene oxide to propylene oxide that is within a range of from 1.4-1.2:1.0 as claimed. The RU '418 reference

also does not contain any teaching or suggestion that would motivate one of ordinary skill in the art to change the size or compositional ratio of the proxamine-385 polymer to arrive at the copolymer as claimed. That is, the RU '418 reference does not teach or suggest that properties of the composition could be improved and/or changed by altering the size of compositional ratio of the copolymer, and in general the reference is silent as to the properties of the polymer that do or could provide advantageous effects in the composition. Accordingly, absent some teaching or suggestion to do so, it is considered that one of ordinary skill in the art would not have found it obvious to substantially modify the size or compositional ratio of the polymer to arrive at the claimed polymer.

Applicants further wish to point out that the RU '418 reference is the same reference distinguished in the Background Section of the instant specification, where it is pointed out that the composition of the RU '418 reference does not provide good quality of coating and requires at least two coating passes and/or higher current densities (*see, e.g.*, paragraph [0008], and results in problems with the control of foam during recirculation of the electrolyte (*see, e.g.*, paragraphs [0007]-[0012] of specification.) In contrast, the composition containing the copolymer of the instant invention unexpectedly provides improved high quality electroplating coatings, controls foam formation and provides other benefits in electroplating that are not taught or suggested by the RU '418 reference (*see, e.g.*, paragraphs [0011]-[0016].)

For example, in Comparison Example 3, it is shown that a composition using proxamine-385 instead of a copolymer according to the claimed invention resulted produced an electroplated coating having properties of “matte, differs in tone, corrosion resistance is low” (paragraph [0038], and paragraphs [0037] and [0039].) In contrast, compositions similar to that of Comparison Example 3, but containing the particular copolymer as claimed, resulted in electroplated coatings that were “bright, without dullness and differences in tone and characterized by high uniformity of distribution and corrosion resistance” (paragraph [0033]) in Examples 1 and 2 (*see, e.g.*, paragraphs [0033]-[0036].) The fact that select copolymers having the particular molecular weight and ethylene oxide to propylene oxide

ratios could provide substantially improved results in the electroplating of tin is not taught or suggested by the prior references such as RU '418, and thus represents unexpected results showing the patentability of the claimed composition over the prior art.

As further evidence of the unexpected results provided by the copolymer when included as a part of the electroplating composition, it is noted that as taught in the specification:

“the use of the above mentioned block copolymer as an addition agent to the electrolyte makes it possible to produce high-quality, easy-to-reflow tin coatings within the maximum range of process parameters, grounded technically and technologically, viz. at temperatures of 20 to 70°C and current densities of 5 to 70 A/dm<sup>2</sup>. Tests performed using a lab unit with rotating cathode at different temperatures and additive content in the electrolyte having indicated that minimum allowable current densities can be even of 5 A/dm<sup>2</sup>” (paragraph [0022].)

Thus, the composition of the instant invention allows for electroplating with lower current densities than those previously required and results in higher quality coatings.

Also, with regards to the composition taught in the RU '418 reference, the composition of the instant invention:

“allows a tin coating deposition of equal or better homogeneity of the deposited tin as compared to the state of the art. In particular the problem of the “edge effect” is reduced, that is, the amount of tin over-coating at the edges of the strip or plate is lowered; this allows: to reduce the amount of tin in the deposition thus reducing production costs and to avoid damages to the strip or coating during subsequent handling of the same” (paragraph [0025].)



Thus, the composition of the instant invention provides advantages in terms of coating homogeneity over prior compositions such as that of RU '418, which reduces production costs and provides coatings having improved qualities.

These unexpectedly good results provided by the instantly claimed invention are not taught or suggested by the RU '418 reference as discussed above, and furthermore are not taught or suggested by either the Brown or Kalinin references. Brown generally teaches alkylene oxide compounds can be provided in tin plating compositions (*see, e.g.*, column 4, lines 9-25), but does not teach or suggest providing nitrogen-bearing block copolymers as claimed having ethylene oxide and propylene oxide, much less a compound having the molecular weight and ratio of ethylene oxide to propylene oxide as claimed. Brown also does not teach or suggest that reducing the size and/or changing the ratio of ethylene oxide to propylene oxide in such a compound could result in the unexpectedly improved results exhibited by the instant invention, such as reduced foaming, improved coating quality and corrosion resistance, and reduced electroplating current density requirements. Accordingly, it is considered that the composition containing the block copolymer as claimed is patentable over the RU '418 reference in view of the Brown reference.

The Kalinin reference also does not teach the block copolymer as claimed, and also does not teach or suggest the unexpectedly good results provided by the claimed composition containing the block copolymer. Kalinin is directed to the use of the same proxamine-385 polymer described in the RU '418 reference for the purposes of improving the lubricity of water-containing formulations with propanol to provide antiwear and antifriction properties in machinery construction (*see, e.g.*, second through fourth paragraphs), and thus is directed to non-analogous art. Kalinin does not teach the use of proxamine-385 or any other block co-polymers for electroplating and/or electrotinning purposes, and thus also does not teach or suggest the unexpectedly good results that are provided by the block copolymers of the instant invention.

It is furthermore noted that the references do not teach or suggest the composition for electroplating having the pH that is within the claimed range of from 0.6 to 1.1, as in claim 1. It is noted that the RU '418 reference, in particular, is silent with regards to the pH of the composition, and thus does not recognize the unexpected benefits provided in electroplating by maintaining the pH within the claimed range. In contrast, Applicants have discovered that:

“the maintenance of pH of the electrolyte in the specified limits, that is pH of 0.6 to 1.1 provides high electric conductivity of the electrolyte resulting in a lowering of energy consumption and at the same time reduces the tin hydrolysis rate and, consequently, decreases tin losses with sludge” (paragraph [0024].)

Thus, Applicants have unexpectedly discovered that maintaining the high pH as claimed reduces overall tin losses and requires less energy for electroplating, advantages which are not taught or suggested by the RU '418 reference.

Brown and Kalinin do not make up for the deficiencies of RU '418 with regards to the pH level. Brown teaches a tin plating composition comprising components other than those claimed or taught in the RU '418 reference (*see, e.g.*, column 3, lines 30-50), and thus any teachings on the part of Brown regarding the pH would be understood by those of ordinary skill in the art to not be applicable to the composition of RU '418 because of differences in the chemical reactivities and contents of the compositions. Furthermore, Brown does not teach or suggest the unexpected results in terms of reduced energy requirements and/or reduced overall tin losses that are exhibit by the compositions of the instant invention. Kalinin also does not make up for the deficiencies of the RU '418 and Brown references because Kalinin is directed to improving lubricity in machines, and thus does not contain any guidance as to conditions suitable for the electroplating/electroplating of compositions.

Accordingly, it is considered that claim 1 is patentable over RU '418, Brown and Kalinin because none of the references teaches or suggests the composition as claimed containing tin in tin sulfamate form, the particular block co-polymer as claimed, and a pH of from 0.6 to 1.1 as claimed, and the references furthermore do not teach or suggest the unexpectedly good results provided by the claimed electroplating composition. Applicants therefore respectfully request withdrawal of the rejection of the claim.

6. Rejection of Claims 3-8 under 35 U.S.C. 103(a) over RU '418, Brown, Kalinin and Ichiba

The Examiner rejected claims 3-8 under 35 U.S.C. 103(a) over RU '418, Brown and Kalinin, as applied to claim 1, and further in view of Ichiba. In particular, the Examiner asserts that RU '418m Brown and Kalinin teach the invention as claimed, with the exception of the particular electroplating steps as recited in the claims, whereas Ichiba teaches the claimed steps (*see, e.g.*, Office Action pages 13-14.) This rejection is respectfully traversed.

Claims 3-8 depend from claim 1, and thus are patentable over the RU '418, Brown and Kalinin references for at least the same reasons as discussed for claim 1 above. In particular, claims 3-8 are directed to method(s) of electroplating with the composition of claim 1, and thus are patentable over the RU '418, Brown and Kalinin references because the references fail to teach or suggest the composition having tin in the form of tin sulfamate, the particular block copolymer, or the pH of from 0.6 to 1.1 as claimed, or the unexpectedly good results in electroplating obtained with the composition.

Ichiba does not make up for these deficiencies. In the section to which the Examiner refers, Ichiba teaches a method of electroplating a strip or plate using various process parameters (*see, e.g.*, column 8, lines 20-45.) However, Ichiba does not teach or suggest providing a composition having the block copolymer as claimed, tin in the form of tin sulfamate, or the benefits of such a composition having the pH as claimed, and furthermore does not teach or suggest the unexpectedly good results provided by the claimed invention.

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Accordingly, claim 1 and the claims depending therefrom, including claims 3-8, are considered to be patentable over the cited references. Applicants respectfully request withdrawal of the rejection of the claims.

*Conclusion*

Applicant respectfully submits that each and every pending claim of the present invention meets the requirements for patentability under 35 U.S.C. § 112 second paragraph, and 35 U.S.C. §§ 102(b) and 103(a), and respectfully requests that the Examiner indicate allowance of each and every pending claim of the present invention.

In view of the foregoing, it is submitted that none of the references of record, either taken alone or in any proper combination thereof, anticipate or render obvious Applicant's invention as recited in each of Claims 1 and 3-8.

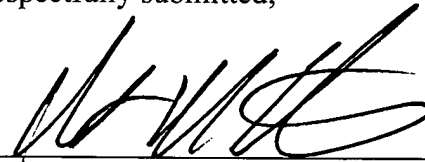
Accordingly, reconsideration of the outstanding Office Action and allowance of the present application and all the claims therein are respectfully requested and now believed to be appropriate.

If any additional fee is required, please charge Deposit Account Number 19-4330.

Respectfully submitted,

Date: 4/10/08

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